

Upper storage encompasses 'everything' above enstore.  
However there are other reports following this one,  
so I will only concentrate on dcache.

Dcache - component that is 1 level about enstore  
files are on disk instead of tape

Goals of dcache, written in collaboration with DESY.

1. Quick re-use of 'hot' cached files
2. Buffer slow clients to optimized (fast) tape drive usage
3. Allow 'posix' io capabilities to clients

Ways dcache can transfer a file to a client:

1. Anonymous ftp read
2. Kerberized ftp write/read
3. Globus-url-copy (gridftp)
  - only certificates allowed are from FNAL KCA
  - all host certs have expired and no users noticed
4. dccp write/read.
  - a. Can be with /pnfs mounted
  - b. Can be without /pnfs mounted as well (door protocol)
  - c. kerberized dccp - code finished & being tested

Dcache has been deployed at:

1. Public system - used by Minos
  - used by Auger
  - going to be used by lqcd
  - going to be used by minos
2. CMS -
3. D0 - 1 test node for D0 functionality tests
4. CDF - largest deployment (was 100 TB in January).
  - this had to be pulled back from production to 'test' because:

- a. PNFS was slow - caused by bad disk hardware. Provoked slow cell communication. Fixed.
- b. 1 client process contacted many doors - threads exploded by factor of 10-30 on admin nodes. Immediate problem fixed, but modeling of load in threads remains.
- c. Bad disk hardware or bad controllers.  
Being worked on by cdf and vendors
- d. Lack of retries on failed encp transfers in dcache.  
Retry script has been added. ~100% success rate.
- e. System reconfigured to allow easier starting & stopping of components.
- f. Database added to aid in more effective error tracing.